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C O N F I D E N T I A L

NACA - Lewis

Cleveland, Ohio
July 1, 1957

NASA Declassification/Release Instructions on File

MEMORANDUM for Associate Director

Subject: Visit to the California Division of Lockheed Aircraft Corporation, Burbank, California, on June 14, 1957.

1. The writer was received by Mr. Clarence L. Johnson, Vice President - Engineering and Research. As reported by Mr. Hartman in his Memorandum for Director, NACA, August 10, 1956, Mr. Johnson was appointed to this newly established position to strengthen the company's position in the field of basic research. Mr. Hartman reported some doubt as to the company's ability to conduct basic research and pointed to Mr. Johnson's continued preoccupation with miscellaneous developmental problems. During the past year Mr. Johnson, as is well known throughout the industry, has continued his activities on miscellaneous defense concepts and has acted as spokesman for the company in his various fields of interest. In Mr. Hartman's memorandum he mentioned Mr. Johnson's unique method of operating his department with such secrecy that no one else in the Lockheed Company knows what is going on. Apparently this practice has continued because in subsequent discussions with other members of the California Division of the Lockheed Aircraft Corporation the statement was made that "Mr. Johnson runs his own private aircraft company."

2. Mr. Johnson explained in considerable detail his philosophy regarding long-range, high-speed aircraft. He plotted a curve with altitude versus range for several speed regimes. One point of this curve was the U-2 which is designed to fly at 70,000 feet for 5,000 miles at Mach 0.77. Another point on the curve was the F-104 with a range of 250 miles at Mach 2 and 60,000 feet. He also spotted the Convair B-58 at 60,000 feet and a range of 1100 miles at Mach 2. The 1100 mile range he stated was, in his opinion, questionable. His analysis of the airplane range-speed-altitude chart was to point out that the only way to do the job was to fly on the deck subsonically for 8,000 miles. His group has submitted to the Defense Department a survey which was made showing a route to the target which met all requirements and would not exceed 500 feet altitude. Mr. Johnson's general philosophies in this respect are pretty well known and require no further discussion in this memorandum.

3. In the discussion of long-range aircraft Mr. Johnson stated that the Maxim L/D which he could see for Mach 2 to Mach 2.5 for full-scale airplanes was 4.5 to 5. He stated that the Mach 2 airplane at 70,000 feet altitude would be with us for about 10 years.

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4. Mr. Johnson was naturally interested in any special fuel which would give his airplane a worthwhile increase in range. He stated that his interest in boron fuels had been dampened by a report made by Navy personnel which stated that only a 12 to 14 percent range increase could be obtained. I questioned this figure stating that it seemed too low and quoted a figure of approximately 20 to 22 percent possible increase. Since my return to the laboratory this figure has been confirmed and a letter so stating was sent to Mr. Johnson at his request. He is following the results of the hydrogen tests with considerable interest but did not appear to be as actively interested in it as in other projects. At the present time he stated that a Lockheed test airplane was scheduled to fly using a special hydrocarbon fuel made by Shell Oil which gave a 12 percent increase in BTU per gallon. He stated there was sufficient quantity of fuel on hand to make flight tests.

5. Subsequent discussions with members of Mr. Johnson's staff confirmed reports that the F-104 is in lateral stability difficulties owing to difficulty with the side inlets. They are especially interested in the research to determine the effect of boundary layer in the inlet on instability. The inlets on the 104 have given lower pressure recovery in flight than had been predicted from test data. Mr. Johnson showed layouts of the new Lockheed jet transport which was discussed at the recent IAS Summer Meeting. It is interesting to note that the engines are located in much the same manner as used on the Caravelle. Four engines will be used in place of two.

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Assistant to the Director

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